**ABSTRACT**

It is a familiar fact that pure substances tend to exist in one of three distinct states: solid, liquid, and gas. Take water, for example, as ice is heated at atmospheric pressure, it suddenly melts into liquid at a specific temperature of 320 F.As the liquid continues to be heated, it eventually reaches a temperature of 1000 Cat which it spontaneously vaporizes into a gas. These transitions are discontinuous i.e they occur at specific state conditions of particular combinations of temperature and pressure. At exactly those conditions, the system can exist in more than one form such that two (or more) phases are in equilibrium with each other.

A Phase is homogeneous region of matter in which there is no spatial variation in average density, energy, composition, or other macroscopic properties. Phases can also be distinct in their molecular structure. For example, water has multiple ice phases that differ in their crystallographic structure. A phase can be considered a distinct “system” with boundaries that are interfaces with container walls or other phases.

The major objective of this project is to maximize the recovery of heavy components of the intermediate group in crude oil, to save the heavy group components in liquid product and to separate the Light Group (C1 and C2) from oil with the application of phase equilibrium calculation method.